

Effects of genotype on the reproductive traits of the female pigs

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Abstract: The study was carried out at the Piggery Research Unit of the Delta State University Farm, Asaba Campus, Nigeria. It was conducted to evaluate the influence of genotype on reproductive traits of the female pigs. A total of 24 weaner pigs made up of 18 females and 6 males of Landrace (LR), Duroc (DU), and Large White (LW) constituted the experimental stock. Data were taken continually every two weeks for the period of the experiment. The data generated were subjected to variance, and significantly different means separated by Scheffe using the General Linear Model (GLM) procedure SPSS (2010) program. Reproductive traits were investigated using standard methods. The findings revealed that genotype groups had significant ($P < 0.05$) effects on litter size of sows at farrowing (LSF), litter birth weight (LBWT), litter weaning weight (LWWT) and pre-weaning gain parameters, respectively. The Large White genetic group was superior in litter size at farrowing (LSF) to the Duroc or the Landrace. The Duroc and Landrace groups were superior in weaning weight (WWT) to the Large White. The Duroc group is superior in pre-weaning gain to Large White and Landrace.

Key words: Genotype, pigs, reproductive traits

I. Introduction

Reproductive performance in sows depends on several factors, such as parity number, breed, season, temperature, photoperiod and nutrition (Gourdine, *et al.*, 2006; Peltoniemi and Virolainen, 2006; Suriyasomboon *et al.*, 2006; and Silva, *et al.*, 2009a). The adverse environmental conditions prevailing in tropical Africa among other factors, such as genotype, could have a varying influence on the reproductive performance of pigs in tropical areas. This present study was carried out to investigate the influence of genotype on reproductive traits of female pigs.

II. Materials and Methods

The study was carried out at the Piggery Unit of the Teaching and Research farm of Delta State University, Asaba Campus, Asaba, Nigeria. Asaba is located between longitude 6°E and 8°N, and between latitude 4°N and 10°N. The mean temperature ranged between 27.90°C -36.90°C. The area has a mean relative humidity range of 76.83% - 85.17%. (Asaba Meteorological Office). A total of 24 weaner pigs made up of 6 females and 2 males each of Landrace (LR), Duroc (DU), and Large White (LW) constituted the experimental stock. They were sourced from the piggery unit of Delta State University investment limited (DIL) farm. The experimental animals were subjected to 14 days adaptation period within which proper routine health management practices were carried out. The animals were reared together in group of three and one according to gender and genotype. The pigs were placed on prophylactic drugs against baby pig anaemia and intestinal worms. Data were taken continually every two weeks for the period of the experiment. The following reproductive traits were carried out on the pigs as applicable: litter size at farrow (LSF); litter birth weight (LBWT); litter weaning weight (LWWT) at 42 days of age (6 weeks); litter size at weaning (LSW); still birth; pre-weaning gain (g day^{-1}); pre-weaning mortality; and gestation period (days). Data collected were subjected to analysis of variance and significantly different means separated by Scheffe using the General Linear Model (GLM) procedure SPSS (2010) program.

III. Results and Discussion

As indicated in Table 1, the effect of genotype was significant ($P < 0.05$) for most of the reproductive parameters measured, except gestation period. Large White (LW) group were found superior for litter size at farrowing (LSF), Duroc (DU) and Landrace (LD) groups for weaning weight (WWT), and Duroc group are superior in pre-weaning gain to Large White and Landrace.

Table 1. Comparison of the mean reproductive performances of the three genotypes of pigs

Parameters	Duroc	Large White	Landrace
Litter size(No. farrowed per litter)	4.67 ± 0.82 ^a	6.17 ± 1.47 ^b	5.00 ± 0.00 ^{ab}
Litter weights (kg)	0.94 ± 0.31 ^a	1.30 ± 0.35 ^b	1.44 ± 0.49 ^b
Weaning weight(kg)	5.99 ± 1.27 ^b	5.12 ± 1.63 ^a	5.95 ± 1.79 ^b
Still birth	2.00 ^{nt}	0.00 ^{nt}	1.00 ^{nt}
Gestation period	115.17 ± 0.98	115.33 ± 0.82	115.33 ± 0.82
Pre-weaning gain(g day ⁻¹)	109.26 ± 23.45 ^b	92.06 ± 28.80 ^a	104.58 ± 27.90 ^{ab}
Litter size at weaning	4.33 ± 0.82 ^a	6.00 ± 1.55 ^b	4.50 ± 0.84 ^a
Pre-weaning mortality	2.00 ^{nt}	2.00 ^{nt}	3.00 ^{nt}

^{a,b} Means with different superscripts in a row are significantly different (P<0.05)

nt: not tested

The results showed significant (P<0.05) variations due to genotype for most of the traits tested except for gestation period. The litter size at farrowing (LSF) range from 4-8 piglets across the genetic groups. Large White had the largest litter size at farrowing (LSF) with mean value of 6.00 piglets. The significant difference between genotype groups in litter size at farrowing (LSF) in the study supports the findings of several authors (Adebambo, 1983; 1986; Gaughler, *et al.*, 1984; Kuhlers *et al.*, 1989; Pathiraja and Oyedipe, 1990; Mukhopadhyay *et al.*, 1992; Sharma and Singh 1995; Pandey *et al.*, 1996; Singh and Devi, 1997; Lakhani and Jogi, 2001; Oseni, 2005; and Pandey *et al.*, 2010). The findings also revealed that genotype had a significant (P<0.05) effect on litter birth weight (LBWT). Significant differences between pig genotypes in litter birth weight have been reported by several authors (Johnson, 1980; Adebambo, 1983; Kuhlers, *et al.*, 1988; Mukhopadhyay *et al.*, 1992; Sharma and Singh, 1995; Singh and Devi, 1997; Oseni, 2005; and Pandey *et al.*, 2010). The significant (P<0.05) effect of genetic groups on litter weaning weight (LWWT) in the present study corroborates the earlier findings of Sharma and Singh (1993); Singh and Devi (1997); Lakhani and Jogi (2000); and Pandey *et al.* (2010). In the present study the Large White had the least mean value for litter weaning weight (LWWT) as compared to the Duroc and Landrace groups. The observed differences between genetic groups could be due to large litter size at weaning (LSW) and litter weight at weaning (LWWT) which are high and positively correlated (Khalil, *et al.*, 1986). The highest pre-weaning gain of 109.26g/day was recorded by the Duroc in this study. This might also be attributed to the small litter size at weaning (LSW).

IV. Conclusion

In this present study the findings has revealed that genotype exerts a substantial influence (P<0.05) on litter size at farrowing (LSF), litter birth weight (LBWT), litter weaning weight (LWWT) and pre-weaning gain performance traits respectively. The Large White genetic group was superior in litter size at farrowing (LSF) to the Duroc or the Landrace. The Duroc and Landrace groups were superior in weaning weight (WWT) to the Large White. The Duroc group is superior in pre-weaning gain to Large White and Landrace.

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